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Groundwater Management Strategy for Michigan
Draft Response and Incident Tracking Procedures

Michigan Dept. of Natural Resources, Lansing

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Jul 82

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groundwater management strategy for michigan

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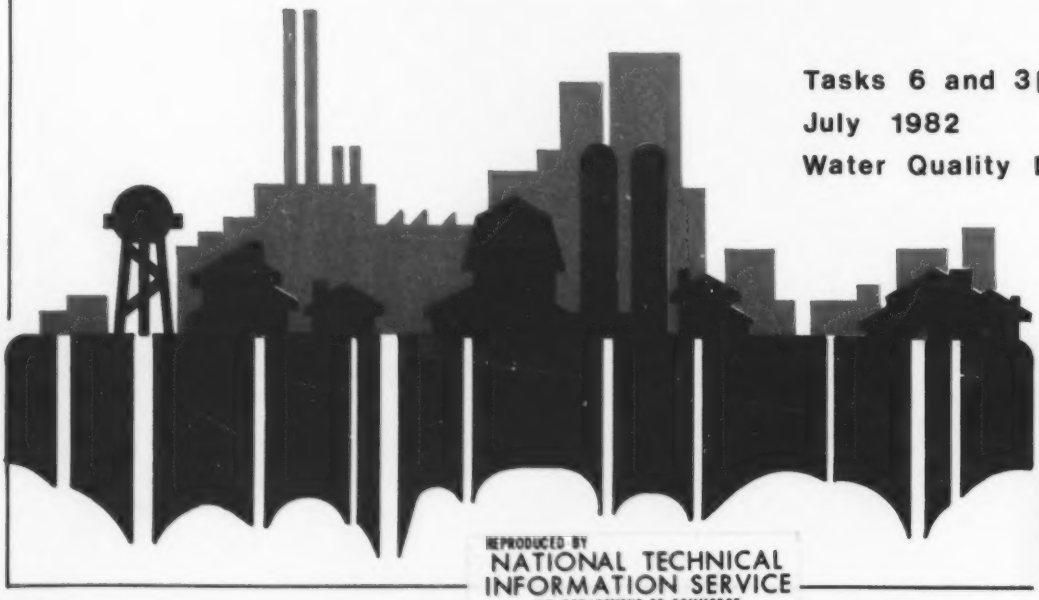

Tasks 6 and 3[a4&5]
July 1982
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Several management tools are needed to guide state response to incidents of groundwater pollution because of the large number of incidents at which State response actions may need to be performed.

Two primary management tools are described in this document. These management tools are:

1. General Response Procedures - guidance as to how and when state actions are initiated in response to incidents of groundwater pollution concern.
2. Incident Tracking Procedures - An Information Management System to facilitate the recording, tracking and distribution of information on the status of each contamination incident.

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Groundwater Pollution
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Water Pollution
Water Quality Management

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DRAFT RESPONSE & INCIDENT TRACKING PROCEDURES

Task 6 and a Portion of Task 3 of Groundwater Management Strategy for Michigan
Major Funding From Environmental Protection Agency Grant No. P00558801

June, 1982

Michigan Department of Natural Resources
Water Quality Division

PREFACE

The Groundwater Management Strategy for Michigan project identifies Task 6 as Decision Making Procedures. Part of Task 3, Groundwater Assessment, involves development of a means to document, communicate, and track information about specific groundwater pollution incidents. Proposed here are: a) rationale and general procedures for guiding state actions in response to specific groundwater pollution incidents (Task 6), and b) general procedures for incident tracking (part of Task 3). This document presents outputs from these two tasks jointly in order to:

1. Provide a basis for discussion of the response element of the final strategy (Task 21).

2. Provide a framework for development of the other tasks in the strategy.

3. Test the effectiveness and validity of this descriptive process with the case studies of Task 19 and other strategy tasks.

Revisions to and further detailing of both the response and information management procedures will be presented in the final strategy document.

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INTRODUCTION

State actions in response to incidents of groundwater pollution (known, suspected or potential) are generally directed toward achieving four goals:

1. To minimize human exposure to groundwater pollutants.

2. To protect and enhance the quality of the groundwater resource.

3. To minimize the impacts of groundwater pollutants on other natural resources.

4. To enforce state pollution control laws as a deterrent to potential polluters and to assure that those responsible for causing groundwater pollution problems bear the costs of resolving them.

The specific actions necessary to achieve these goals vary with each individual incident or concern. Actions which may be necessary to resolve the concerns caused by a given incident include the following (not all actions will apply to all incidents):

1. Determination as to whether a pollutant release to the soil, subsurface or groundwater has actually occurred.

2. Determination of types and quantities of substances released, the nature of the release (e.g. spill, leachate) and its duration.

3. Assessment of impacts on drinking water supply wells.

4. Provision of alternate drinking water supplies (temporary and/or permanent) where existing supplies are contaminated.

5. Identification of the pollutant source(s) - both the point at which pollutants were released to the environment and parties potentially responsible for the release.

6. Pursuance of enforcement actions to assure that illegal activities are discontinued and to hold culpable parties accountable for past actions.

7. Curtailment of the pollutant source(s) to prevent additional contaminant release into soils, subsurface and groundwater.

8. Determination of the lateral and vertical extent of the contamination and of the ultimate fate of any uncontrolled pollutants.

9. Evaluation and implementation of appropriate removal, control, or monitoring of pollutants in unsaturated soils.

10. Evaluation and implementation of appropriate removal, control, or monitoring of pollutants in the groundwater.

Several management tools are needed to guide state response to incidents of groundwater pollution concern because of the large number of incidents (more than 800 known or suspected and several thousand potential sites statewide) at which any of the above listed actions may need to be performed. Two primary management tools are:

1. General Response Procedures - guidance as to how and when any of the preceding 10 actions are initiated in response to incidents of groundwater pollution concern.

2. Incident Tracking Procedures - an Information Management System to facilitate the recording, tracking and distribution of information on the status of each contamination incident.

RESPONSE PROCEDURES

Draft response procedures are presented in this report as proposed guidance for state response to site specific groundwater pollution concerns. The procedures provide for:

1. Immediate follow-up in cases where prompt actions can be taken to help remedy the problem (i.e. spill response).

2. Incidents needing more extensive follow-up to have their environmental pollution significance determined; their specific needs identified; and follow-up pursued according to a general strategy developed for incidents of similar circumstances.

3. Fully resolved incidents or ones with little potential for causing significant groundwater quality degradation to be documented for future reference.

4. Documentation of sites of potential groundwater pollution for which preventive measures and monitoring may be needed.

Figure 1 illustrates the general manner in which actions would be pursued and decisions made to address site specific groundwater pollution concerns. Some explanation of the various steps in the process is provided here. In many cases, more specific procedures or guidelines for particular steps are being developed in other tasks in the Groundwater Management Strategy project.

The response procedures begin with the receipt of information identifying a specific incident of known, suspected or threatened groundwater pollution and follow the paths shown by arrows in the figure. Certain steps in the process are numbered for reference, but do not necessarily indicate the order in which actions are pursued. Triangular symbols indicate critical decision points at which state response efforts may be significantly redirected, depending upon actions to date and available information. Circles represent classifications of groundwater pollution incidents. Rectangular symbols denote major pathways under development for ultimate resolution of contamination incidents. Brief descriptions of the actions identified in Figure 1 are as follows:

1. *Check inventory: Examine central data base for groundwater pollution incidents (Information Management System described later in the text). Determine if the information has already been noted by the state or if it identifies a new incident, greater concern, etc.

   *Record new information: Start a site file for incidents reported for the first time. For incidents already inventoried, new data received must be added to the existing record. Provide informant with incident status, agency contacts and other pertinent information.

Figure 1

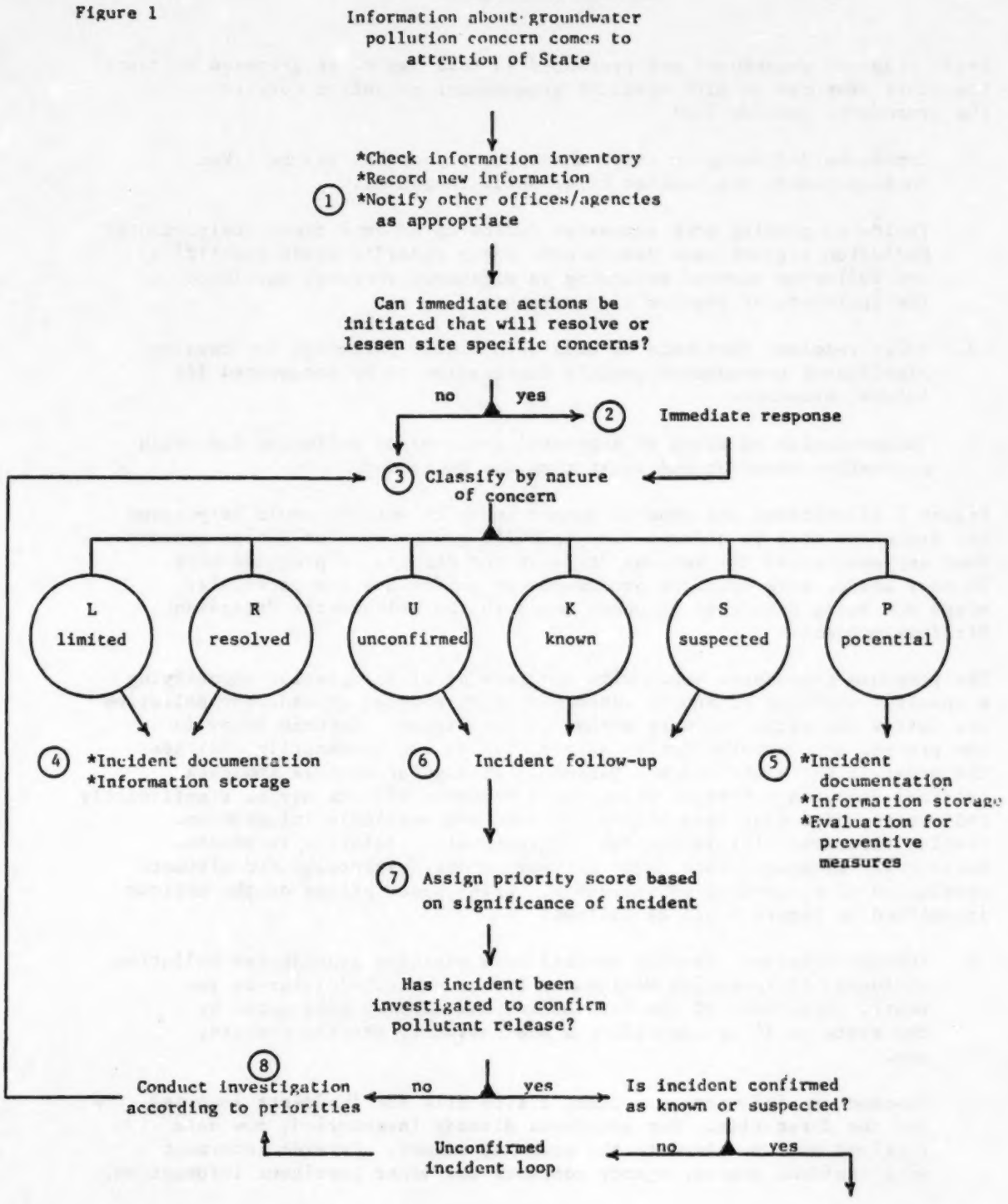
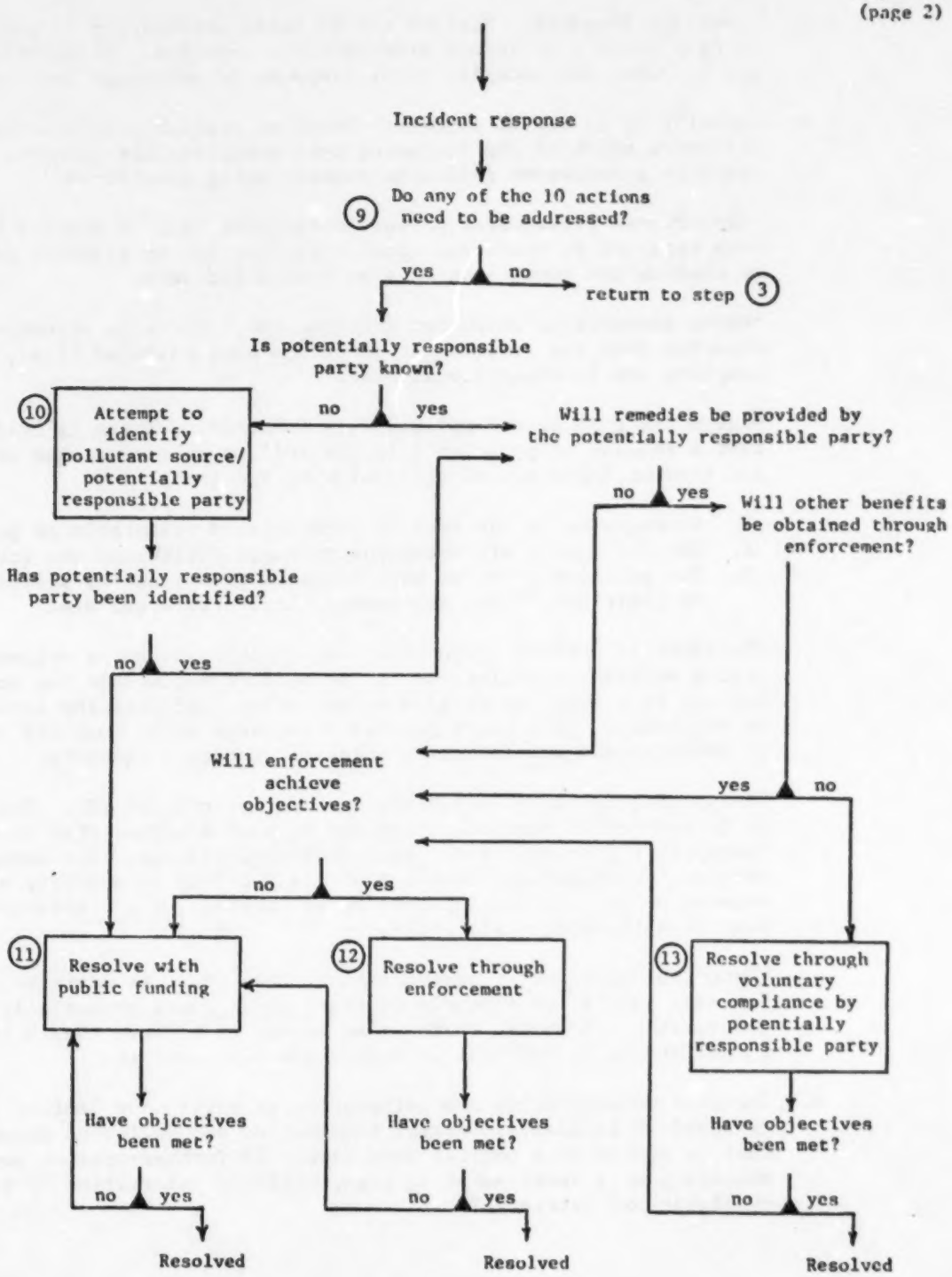

Information about groundwater pollution concern comes to attention of State
*Check information inventory
*Record new information
1
*Notify other offices/agencies as appropriate
Can immediate actions be initiated that will resolve or lessen site specific concerns?
no
yes
2
Immediate response
3
Classify by nature of concern
L limited
R resolved
U unconfirmed
K known
S suspected
P potential
4
*Incident documentation
*Information storage
6
Incident follow-up
5
*Incident documentation
*Information storage
*Evaluation for preventive measures
7
Assign priority score based on significance of incident
Has incident been investigated to confirm pollutant release?
8
Conduct investigation according to priorities
no
yes
Is incident confirmed as known or suspected?
Unconfirmed incident loop
no
yes

Figure 1
(page 2)



*Notify other agencies: Other state and local offices which need to be involved should be notified of the incident.

2. Immediate Response: Actions can be taken immediately in some cases to help resolve or lessen site specific concerns. These actions may include, for example, spill response or emergency containment.

3. Classify by nature of concern: Based on available information, determine which of the following best describes the nature of the specific groundwater pollution concern being considered:

*Unconfirmed groundwater pollution incident (U). A concern has been reported to state and local officials but no evidence exists to confirm the occurrence of a pollution incident.

*Known groundwater pollution incident (K). There is scientific evidence that the groundwater is or has been polluted (i.e., well sampling and laboratory analysis).

*Suspected groundwater pollution incident (S). There is evidence that a release of pollutants to the soil or subsurface has occurred and that at least two of the following are true:

1. Groundwater in the area is particularly vulnerable to pollution.
2. The pollutants are hazardous to human health and the environment.
3. The pollutants are or were released in a quantity sufficient to limit use of the groundwater in the affected area.

*Incident of limited groundwater impact (L). There is evidence that a release of pollutants to the soil or subsurface has occurred, but not at a location or in a manner which qualifies the incident as suspected. This class generally includes small quantity releases of nonhazardous substances in areas of protected aquifers.

*Resolved groundwater pollution incident or concern (R). The incident is determined to have been resolved in such a manner that it no longer fits into any of the aforementioned classes. For example, on-site investigation reveals that the facility or activity never existed or on-site cleanup results in recovery of all materials lost in a transportation spill.

*Potential groundwater contamination sites (P). An activity or facility exists (or formerly existed) which could potentially pollute groundwater. However, there is no reason to believe that a release of pollutants to the soil or subsurface has occurred.

4. Incident documentation and information storage: For limited impact or resolved incidents, initial information and follow-up documentation will be stored in a central data base. If further actions become necessary at a later point in time, incident information is readily available and retrievable.

5. Incident documentation, information storage and evaluation: For sites of potential groundwater contamination concern, initial information and follow-up documentation will be stored in the central data base. Additionally, these sites/facilities will be evaluated for on-going preventive measures as time and available resources allow.

6. Incident follow-up: For sites classified as known, suspected or unconfirmed, a preliminary assessment should be initiated. This preliminary assessment may include contacting other agencies and local governmental officials; sampling and analysis of existing wells, pollutant sources and surface waters; and directing potentially responsible parties to initiate remedial action.

7. Assign priority score based on significance of incident: Perform an analysis of the severity of the incident and assign a priority rating. A state priority system is under development in Task 1 of the Groundwater Management Strategy for Michigan.

8. Conduct investigation: Incidents which have not had basic field investigations performed to document and confirm site conditions will be prioritized for staff investigation based on ratings developed in Step 7. If a basic investigation has been completed but the incident remains unconfirmed, the prioritization is for purposes of doing more extensive investigation. Investigations may include, but are not limited to, communication with local authorities, researching local history, field observations, sampling and laboratory analysis, geophysical studies and full scale hydrogeological studies. While these investigations are for the primary purpose of confirming whether or not a release of pollutants to groundwater, soils or subsurface areas has actually occurred, they may result in identification of responsible parties.

9. Evaluate need for further acti ns: At least the first of the ten actions listed in the introduction needed to resolve groundwater pollution concerns will have been completed for all incidents which reach this point in the response procedure pathway. The incident is now evaluated as to whether or not actions 2 through 10 have been completed. Based on this evaluation, it is possible that further state response efforts will not be necessary. However, in most cases additional effort will be needed to further resolve all site specific concerns. It should be noted that guidance for conducting this critical evaluation will be provided in the final strategy document.

Further remedial actions may proceed either at public expense, at the expense of responsible parties, or some combination thereof, depending on the circumstances of each incident. Several potential resolution pathways are being evaluated in Task 19 of the Groundwater Management Strategy project to determine the best means to resolve certain types of incidents. Decisions to be made in determining how an incident will

be resolved are outlined following Step 9 in Figure 1. Essentially, the system depends upon three basic pathways: (a) resolution through use of public funds, (b) resolution through an enforcement action taken against the responsible party, and (c) resolution through voluntary action by the responsible party. Significant steps within the three basic pathways are emphasized and numbered 10 through 13 in Figure 1. Specific guidance for implementation of these steps is currently being developed in other tasks as part of the Groundwater Management Strategy. The particular tasks are referenced as follows beginning with Step 10 in Figure 1:

10. Attempt to identify pollutant source/potentially responsible party: Task 7, Hydrogeologic Study Procedures (completed in March 1982), provides guidance on when, where and how hydrogeologic investigations should be conducted at sites of known or suspected groundwater contamination. Task 19, Groundwater Contamination Case Studies, involves an analysis of eight different types of known groundwater pollution incidents. The final output will include recommended procedures for source identification.

11. Resolve through public funds: Task 1, Priority System Development, will result in a system for ranking sites which require use of public funds. Task 18, Financing Cleanup, will consider available and possible alternative methods for financing groundwater programs and cleanup operations.

12. Resolve through enforcement: Task 14, Compliance and Enforcement, involves an evaluation of existing compliance and enforcement programs and development of enforcement procedures and referral criteria necessary for various enforcement actions.

13. Resolve through voluntary compliance by the potentially responsible party: Task 14, Compliance and Enforcement, includes development of compliance procedures in addition to the items indicated above. The Task 19 Groundwater Contamination Case Studies output will include recommended procedures for monitoring remedial actions resulting from voluntary compliance by a polluting party.

INCIDENT TRACKING PROCEDURES - INFORMATION MANAGEMENT SYSTEM

Information about sites of groundwater pollution concern comes to the state's attention in a variety of ways. This information frequently needs to be distributed to other governmental offices and to the public. A manageable means of documenting actions taken or needed to resolve specific incidents and of making information readily available is vital due to the increasing number of groundwater contamination incidents statewide. One key element of the system proposed here is a tracking form on which essential site specific information is recorded. The recorded information serves to:

1. Identify the location of the incident.
2. Describe the nature of the incident.
3. Document actions needed to resolve the incident.
4. Document actions completed.
5. Provide information for other purposes, such as establishing priority rankings for remedial actions.

Pertinent information is easily transmitted on this form to the various agencies and individuals needing the information either on a regular basis or upon request.

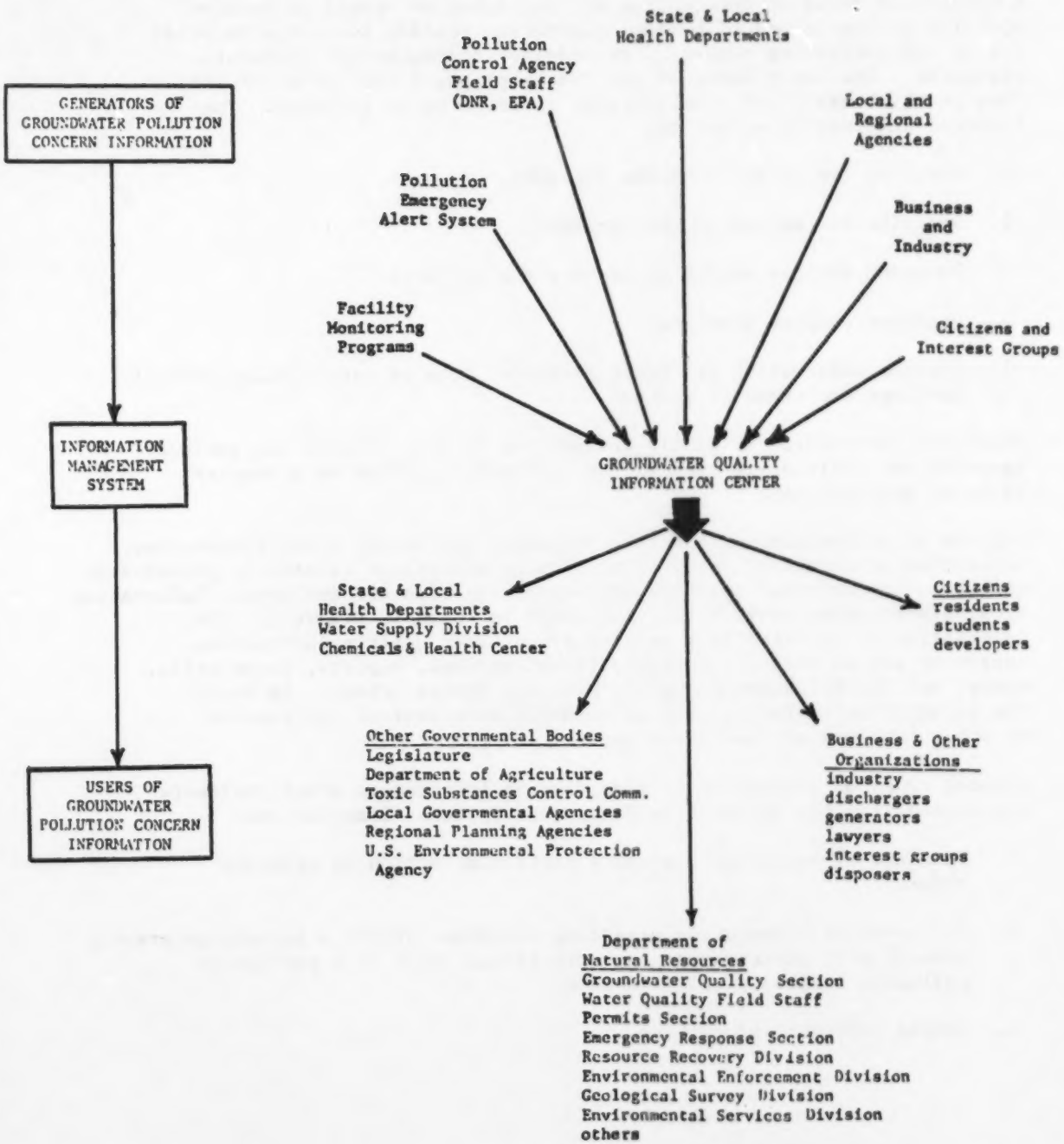
Sources of information on specific incidents can be any party discovering, collecting or reporting data, or monitoring activities related to groundwater quality. Governmental agencies and private parties are included. Information flow between major contributors and users is shown in Figure 2. The information is directed to a central groundwater quality information center by way of personal contact, investigations, reports, phone calls, memos, and the Pollution Emergency Alerting System (PEAS). In turn, the information center is able to transmit this central information to other involved or interested parties.

Several types of outputs containing varying information about incidents are needed from the Information Management System. Examples are:

1. Rankings of incidents needing a particular action in priority order.
2. All recorded information regarding incidents within a certain geographic area or with other common characteristics, such as a particular pollutant or geological formation.
3. Single incident information.

FIGURE - 2
GROUNDWATER POLLUTION CONCERN
INFORMATION MANAGEMENT SYSTEM

-Information Flow-



4. Routinely communicated information, such as total numbers of known and suspected sites.

5. Complete displays of information on an instanteous basis and printed information within a few days time.

Tracking Form

A prototype Incident Tracking and Notification Form (see Figure 3) was developed as a format for recording, storing and transmitting information about groundwater pollution incidents. The information included is needed for implementing the draft response procedures and is commonly requested by interested parties. It is anticipated that some modification of this tracking sheet will be used in a computerized Information Management System.

Data Storage and Retrieval

A limited system is currently being used to manage selected information of the type included on the prototype tracking form. A word processor with limited sorting capabilities has been used to store prioritization scores and to hold and generate several other large listings, but is not sophisticated enough to produce all the necessary outputs anticipated. However, the word processor has shown the value of an automated information management system in maintaining, updating and disseminating data for groundwater contamination incidents.

Several options are being pursued to identify, develop and test a system capable of performing the desired functions. The system chosen should be able to generate any list containing all or part of the information reported on the tracking sheet.

In addition to maintaining information and data, the system should allow easy access for quick reference, such as during a phone request for information. The information management system would serve as a central information bank for use by all parties concerned with groundwater contamination incidents, thereby facilitating better management of and response to statewide groundwater quality problems.

Figure 3
Information Management System

INCIDENT TRACKING AND NOTIFICATION FORM
FOR GROUNDWATER POLLUTION INCIDENTS

PART A - SITE IDENTIFICATION

site name _____ county _____
address _____ location _____
city _____

staff contact _____
other contact _____

PART B - INCIDENT DESCRIPTION

classification _____ category(I-VIII) _____
type facility/incident _____ Active/Inactive ☐
source/type of release _____
pollutant released? yes/no ☐ Substance(s): _____
groundwater contaminated _____ with _____
drinking water wells contaminated _____ number _____ type _____
contaminants _____

PART C - PROGRESS TOWARD INCIDENT RESOLUTION

	NOT NEEDED	NEEDED	UNDERWAY	COMPLETED
1. Determine if polluting substances released	___	___	___	___
2. Identification of specific pollutants: a)released	___	___	___	___
b)soils	___	___	___	___
c)groundwater	___	___	___	___
3. Assess drinking water well impacts: a)initial	___	___	___	___
b)routine	___	___	___	___
4. Provide alternate water supplies: a)interim	___	___	___	___
b)permanent	___	___	___	___
5. Identification of source(s) of pollutants:				
a)physical origin of release	___	___	___	___
b)potentially responsible party(s)	___	___	___	___
6. Pursue enforcement actions	___	___	___	___
7. Termination of release	___	___	___	___
8. Determine extent & impacts of pollutants: a)soils	___	___	___	___
b)groundwater	___	___	___	___
9. Address soil pollutants: a)options analysis	___	___	___	___
b)resolution decision	___	___	___	___
c)remedies implemented	___	___	___	___
10. Address groundwater pollutants: a)options analysis	___	___	___	___
b)resolution decision	___	___	___	___
c)remedies implemented	___	___	___	___

PART D - ACTIONS TAKEN

Entered in card file _____ date _____
Office review _____ date _____
Site visit _____ date _____
Hydrogeologic study _____ date _____
Potential Severity Rating scores ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ date _____
Mitre Rating scores ___ ___ ___ ___ ___ 3 route score total _____ date _____
Other rating method ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ date _____
Information in: ___Section files
___W.Q. Division files, under _____
___Other _____
Referred to EED _____ date _____ Refered to CERCLA ___ ___ date _____

Copies provided to: ( ) EED ( ) WQD District ( ) Local Health Dept.
( ) RRD ( ) MDPH

Last Update _____ by _____

GWQ Section

CONCLUSION

The Draft Response and Incident Tracking Procedures presented here are being further defined, developed, and tested. Other tasks in the Groundwater Management Strategy for Michigan project will provide further guidance on how one makes decisions or implements actions called for in the draft procedures. The response and tracking procedures will be revised as appropriate in the final strategy development effort (Task 21).